

**CLAIMS:**

1. A method comprising:  
generating link failure information identifying a failed link within a computer  
5 network; and  
communicating the link failure information to routers within the computer network.

2. The method of claim 1, wherein communicating the link failure information  
includes generating a link failure message that includes the link failure information.

3. The method of claim 1, wherein communicating the link failure information  
comprises:

communicating to the routers an update message that request withdrawal of one or  
more routes that rely upon the failed link; and

15 incorporating the link failure information within the update message.

4. The method of claim 3 further comprising generating the update message to  
conform to the Border Gateway Protocol (BGP).

5. The method of claim 1, wherein generating link failure information includes  
generating data defining a time period for storing the link failure information.

6. The method of claim 1, wherein generating link failure information includes  
generating data defining a time period for using the link failure information to control routing  
25 decisions.

7. The method of claim 1 further comprising routing data packets according to a  
path vector routing algorithm using the link failure information.

8. The method of claim 7, wherein routing data packets comprises routing data  
30 packets according to the Border Gateway Protocol (BGP).

9. The method of claim 1 further comprising detecting the failure of the link within the computer network.

5 10. A method comprising:  
receiving link failure information identifying a failed link within a computer network;  
receiving a packet identifying a destination within the computer network; and  
forwarding the packet according to a path vector routing protocol using the link  
failure information.

10 11. The method of claim 10, wherein forwarding the packet comprises routing the  
packet according to the Border Gateway Protocol (BGP).

15 12. The method of claim 10, wherein forwarding the packet comprises:  
selecting a route based on a routing table, wherein the route defines a path to the  
destination; and  
discarding the route when the path uses the failed link.

20 13. The method of claim 10, wherein the link failure information defines a valid  
time period for the information, the method further comprising routing the packet according  
to the link failure information prior to the expiration of the valid time period.

25 14. The method of claim 13, further comprising routing the packet without using  
the link failure information after the expiration of the valid time period.

30 15. The method of claim 10 further comprising:  
storing the link failure information for a storage time period; and  
selectively forwarding additionally received copies of the link failure information  
based on the expiration of the storage time period.

16. The method of claim 10 further comprising:

authenticating the link failure information; and  
routing the packet using the link failure information when the link failure information  
is authenticated.

5           17.     The method of claim 17, wherein authenticating the link failure information  
comprises verifying that the link failure information originated from a neighboring router.

18.     A computer-readable medium having data structures thereon comprising:  
a first data structure to store an identifier for a failed link within a computer  
10   environment; and  
a second data structure to store a unique identifier for an originator of the link failure  
information.

15           19.     The computer-readable medium of claim 18 further comprising a third data  
structure to store a valid time for the link failure information.

20.     The computer-readable medium of claim 19, wherein the third data structure  
stores a pair of Internet Protocol (IP) addresses.

20           21.     The computer-readable medium of claim 18 further comprising a third data  
structure to data defining a storage time for the link failure information.

22.     The computer-readable medium of claim 18 further comprising:  
a third data structure to store a timestamp indicating when the link failed;  
25   a fourth data structure to store security data for authenticating the originator.

23.     A computer-readable medium containing instructions to cause a  
programmable processor to:  
receive link failure information identifying a failed link within a computer network;  
30   store the link failure information; and

forward a data packet to neighboring routers within the computer network according to the link failure information and a path vector routing protocol.

24. The computer-readable medium of claim 23 having instructions to cause the programmable processor to select a route for the data packet based on a routing table.

25. The computer-readable medium of claim 24, wherein the link failure information defines a valid time period for the information, the medium having instructions to cause the programmable processor to select the route prior to the expiration of the valid time period.

26. The computer-readable medium of claim 23, wherein the path vector routing protocol comprises the Border Gateway Protocol (BGP).

27. A system comprising:  
 a data store to hold link failure information identifying failed links within a computer network;  
 a routing table to store routing information describing available routes to nodes within the computer network; and  
 a control unit to forward packets through the computer network based on the link failure information and the routing information.

28. The system of claim 27, wherein the control unit routes packets according to a path vector routing protocol.

29. The system of claim 28, wherein the path vector routing protocol comprises the Border Gateway Protocol (BGP).

30. The system of claim 27, wherein the control unit selects routes based on the routing table in order to route the packets around the failed links identified by the link failure information within the data store.

31. The system of claim 27, wherein the link failure information comprises data defining a valid time period for the link failure information.

5 32. The system of claim 27, wherein the link failure information comprises data defining a storage time period for the link failure information.

33. The system of claim 27, wherein the link failure information comprises data defining a timestamp indicating when the link failed.

10 34. The system of claim 27, wherein the link failure information comprises data defining a unique identifier for an originator of the link failure information.

15 35. The system of claim 34, wherein the link failure information comprises security data for authenticating the originator.

36. The system of claim 34, wherein the control unit stores link failure information within the data store when the originator comprises a neighboring router.

20 37. The system of claim 27, wherein the data store comprises a table.

38. The system of claim 27, wherein the data store comprises a database.